FISH FAUNA OF THE BENSBACH RIVER, SOUTHWEST PAPUA NEW GUINEA

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Hitchcock, G. 2002 5 31: Fish fauna of the Bensbach River, Southwest Papua New Guinea, *Memoirs of the Queensland Museum* 48(1): 119-122. Brisbane. ISSN 0079-8835.

During anthropological research in the Bensbach river area of far southwestern Papua New Guinea, 1995-2000, an inventory of fish species in the river yielded 40 species. Taken together with other records and collections from the area a total fish population of at least 63 species is postulated. ❐ *Fish, species, Bensbach River, Papua New Guinea.*

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The distribution of New Guinea's freshwater fishes is very much correlated with the island's geology. There are two main zoogeographic provinces — a northern and a southern, divided by the central highlands. The southern is more speciose, reflecting a long and relatively stable geological history. In addition to a number of endemic fishes, the province also shares some 33 species with northern Australia, on account of the recent land connection between the two areas. This low-lying land bridge was inundated during the Holocene marine transgression, which created Torres Strait some 6,000-8,000 years ago (Allen, 1991; Jennings, 1972).

As Hyslop (1996) noted, our knowledge of New Guinea freshwater ichthyofauna is somewhat limited and is mainly focused on major river systems. For the southern province, information on fish species composition exists for the Fly (Roberts, 1978) and several systems further east: the lower and upper Purari (Haines, 1979, 1983; Allen & Jebb, 1993); the Brown, Goldie and Laloki (Berra et al., 1975); and the Angabanga (Hyslop, 1996).

Between 1995 and 2000 anthropological research was conducted on the environmental knowledge and subsistence systems of the people of the Bensbach River area in the Western Province, Papua New Guinea (PNG). As part of this research, an inventory of the fish species in the river was compiled.

THE BENSBACH RIVER AREA

The Bensbach River, also known as the Torassi, is a highly sinuous river situated in the extreme southwest corner of PNG (refer SC-54 Torres Strait 1:1,000,000 topographic map sheet for location of places mentioned in text). The mouth of the river marks part of the international boundary with the Indonesian province of West Papua (141°01'10" E).

The environment of southwest PNG is unique in the country: It is wide, low and flat, and the landscape — savanna and seasonal wetlands — strongly resembles that of coastal and adjacent areas of northern Australia. The area experiences a monsoonal or tropical savanna climate, with approximately 75% of annual rainfall (1,682mm for Morehead) falling during a December to May wet season (Paijmans et al., 1971; Waithman, 1979). Much of the middle and lower Bensbach area is inundated during the wet season, on account of poor drainage characteristics and water draining into the area from higher rainfall areas to the north (Paijmans et al., 1971). In the dry season most of the area dries out as the waters gradually recede via a network of channels, although lagoons, small lakes and swamps remain in places. As the dry season progresses, tidal action pushes salt water approximately 100km upstream.

METHODS

The fish inventory was compiled using previous research (Allen, 1991; pers. comm. 1998); observation and collection of villagers' fish captures; and interviews using pictures (Whitehead, 1995). Villagers were also asked to collect any non-economic species they encountered while fishing. I also utilised the following techniques to collect fish: blocking of small swamp drainage channels flowing into the river at the end of the wet season using a fine mesh net; night fishing along the banks of the river using a pronged spear and torch; and shooting of fish using .22 rounds.

The majority of the fish were collected in the middle Bensbach area. Only two specimens were collected or identified near the river mouth, *Peri-*

ophthalmus novaeguineaensis and *Periophthalmodon freycineti*. *Periophthalmus novaeguineaensis* was observed at the mouth of the Bensbach River, but the voucher specimen was collected from the mouth of the Morehead River, the next river to the east.

Specimens were preserved in 10% formalin or 90% ethanol solutions. Identifications were made with reference to Allen (1991); further identifications of collected specimens and photographs of fish were made in Australia by staff of the Western Australian Museum, Perth (WAM), and Queensland Museum, Brisbane (QM).

RESULTS

I identified 40 fish species from the Bensbach River in the period 1995-2000. Twenty-three specimens have been deposited as voucher specimens in the Western Australian and Queensland Museums (Table 1).

Jerry Allen of the Western Australian Museum visited the middle Bensbach River in 1982 (29 September-1 October) and collected 32 species now housed at the Western Australian Museum (Allen, pers. comm. 1998). Of the fishes he collected I encountered 19; 13 were not: *Nematalosa erebi*, *Pseudomugil gertrudae*, *P. tenellus*, *Ophisternon gutturale*, *Ambassis macleayi*, *Pingalla lorentzi*, *Glossamia narindica*, *Liza macrolepis*, *Hypseleotris compressa*, *Oxyeleotris aruensis*, *Oxyeleotris paucipora*, *Glossogobius* sp. and *Redigobius bikolanus*.

As at 1975 the fish reference collection at the Kanudi Fisheries Research Laboratory in Port Moresby held 10 species from the Bensbach River. These were collected in October 1969 and May-June 1970 (Kailola, 1975). Of these, *Ambassis interruptus*, *A. nalua* and *A. urotaenia* (identified as *A. commersoni* in Kailola (1975), this specimen is most likely *A. urotaenia* [Jerry Allen, pers. comm. 2000]) were the only species not collected by Allen or myself. Details of specimens that may have been added to it since 1975 are currently not available (Ursula Kolkolo, National Fisheries Authority, pers. comm. 1999).

When my inventory is combined with that of Allen (unpubl. data) and the Kanudi fish reference collection, a total of 56 species are known to occur in the Bensbach River.

TABLE 1. Checklist of the Fishes of the Bensbach River. V = voucher specimen, P = specimen identified from photograph held by author.

Family Species	GH 1995-2000	Allen 1982	Kanudi 1969-1970
Indigenous Species			
Carcharhinidae – sharks			
Carcharhinus leucas	P		
Carcharhinus amboinensis	P		
Pristidae – sawfish			
Pristis microdon	P		
Osteoglossidae – saratoga			
Scleropages jardinii	P	V	V
Megalopidae – tarpons			
Megalops cyprinoides	P		
Clupeidae – herrings			
Nematalosa erebi		V	
Engraulididae – anchovies			
Thryssa scratchleyi	P	V	
Ariidae – fork-tailed catfishes			
Arius graeffei	QMI37105	V	
Arius leptaspis	WAMP.31342-006		
Plotosidae – eel-tailed catfishes			
Neosilurus ater	P	V	
Porochilus meraukensis	WAMP.31380-002		
Belonidae – longtoms			
Strongylura krefft	P		
Melanotaeniidae – rainbowfishes			
Iriatherina werneri	WAMP.31342-010	V	V
Melanotaenia maccullochi	WAMP.31342-008	V	
Melanotaenia splendida rubrostriata	WAMP.31342-013	V	V
Pseudomugilidae – blue-eyes			
Pseudomugil gertrudae		V	
Pseudomugil tenellus		V	
Atherinidae – hardyheads			
Craterocephalus randi	WAMP.31342-007 WAMP.31380-006	V	V
Synbranchidae – swamp eels			
Ophisternon bengalense	WAMP.31342-005		
Ophisternon gutturale		V	
Centropomidae – barramundi			
Lates calcarifer	P	V	
Ambassidae – glass perchlets			
Ambassis agrammus	WAMP.31342-012	V	
Ambassis interruptus	WAMP.31380-005		V
Ambassis macleayi		V	V
Ambassis nalua			V
Ambassis urotaenia		V	V
Denariusa bandata	WAMP.31342-011	V	V
Parambassis gulliveri	P		

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DISCUSSION

The number of fishes known from the Bensbach River is similar to other river systems in southern Papua New Guinea. Hyslop (1996) found 43 fish species in the Angabanga River; Haines (1979) found 51 in the Purari; and Berra et

TABLE 1 (*cont.*)

Family Species	GH 1995-2000	Allen 1982	Kanudi 1969-1970
Terapontidae – grunters			
Amniataba affinis	P	V	
Hephaestus raymondi	WAMP.31342-001		
Pingalla lorentzi		V	
Variichthys lacustris	WAMP.31342-002		
Apogonidae – mouth-almighties			
Glossamia aprion	WAMP.31340-001	V	
Glossamia narindica	WAMP.31342-003	V	
Datnioididae – tigerfishes			
Coius campbelli	P		
Toxotidae – archerfishes			
Toxotes chatareus	P	V	V
Toxotes lorentzi	WAMP.31380-003		
Mugilidae – mullets			
Liza macrolepis		V	
Liza subviridis	P	V	
Eleotridae – gudgeons			
Hypseleotris compressa		V	
Mogurnda mogurnda	WAMP.31341-001		
	WAMP.31381-001		
Oxyeleotris aruensis		V	
Oxyeleotris fimbriata	P		
Oxyeleotris herwerdenii	WAMP.31341-002	V	
	WAMP.31380-001		
Oxyeleotris nullipora	WAMP.31342-009	V	
	WAMP.31381-002		
Oxyeleotris paucipora		V	
Gobiidae – gobies			
Glossogobius sp.		V	
Redigobius bikolanus		V	
Periophthalmus novaeguineaensis	WAMP.31382-001		
Periophthalmodon freycineti	QM131074		
Kurtidae – nurseryfishes			
Kurtus gulliveri	QM131073		
Soleidae – soles			
Aseraggodes klunzingeri	WAMP.31342-004	V	
Non-indigenous Species			
Clariidae – walking catfishes			
Clarias batrachus	WAMP.31341-003		
Cichlidae – cichlids			
Oreochromis mossambica	P		
Anabantidae – climbing perches			
Anabas testudineus	WAMP.31380-004		
Channidae – snakeheads			
Channa striata	P		

al. (1975) found a combined total of 43 species for the Brown, Laloki and Goldie Rivers. Fifty-five species of freshwater fish have been collected in Kakadu National Park in the Northern Territory of Australia, a similar wetland environmental area (Press et al., 1995). Of these, 25 are shared with the Bensbach River system.

Local people interviewed about the river's fishes, using the pictures in Allen (1991) as a guide (Whitehead, 1995), stated that a number of additional species are present in the Bensbach. At least twenty additional freshwater fish species are known to occur in other rivers of central-southern New Guinea (Allen, 1991). On the basis of this distribution of fishes, Osborne (1993, pers. comm. 1999) has suggested that some 63 species may occur in the Bensbach River. As most of the species collected here and by Allen are from the middle Bensbach, it is recommended that further collecting be undertaken in the lower and upper reaches of the system, as well as the creeks and permanent swamps. It is probable that this will add to the total number of fishes known from the system.

Local people also identified significant recent impacts on the Bensbach River fishery linked to environmental changes and introduced species. Javan Rusa deer (*Cervus timorensis*), an introduced species which first entered this part of the Western Province in the late 1940s/early 1950s, have destroyed much of the riverbank grasses and permanent swamps in the area through overgrazing and trampling. According to the local people, the destruction of much of this habitat has resulted in a marked decline of certain species, such as eleotridids.

Four of the species collected are recent exotic introductions from the Merauke area in southeast West Papua: *Anabas testudineus*, *Oreochromis mossamba*, *Clarius batrachus* and *Channa striata*. All have entered the system via human vectors, namely transmigrants from other parts of Indonesia who have brought their food fishes with them to the West Papua border area. Government records at Balamuk village indicate that *A. testudineus* was first encountered in the Weam area of the Bensbach in 1985, possibly entering the river via drainage ditches associated with the building of the Trans-Irian Highway, which in 1982 crossed the international border in two locations near the upper Bensbach River (May, 1986). *O. mossamba* and *C. batrachus* are more recent introductions, first encountered by villagers on the middle Bensbach around 1995. Two specimens of *C. striata* observed by the author in August 2000 at Balamuk and Wando

villages were among the first of this species to be caught by local people. This species is regarded as a particularly voracious predator of native fish (Allen, 1991). The recent introduction and rapid spread of these fishes is a grave threat to the biosecurity of this and other freshwater ecosystems in Papua New Guinea, and warrants further monitoring and research.

ACKNOWLEDGEMENTS

I wish to thank the communities of the Bensbach River for their invaluable assistance and teaching during my time in the field. James Menzies (formerly of the Biology Department) and Budai Tapari (Geography Department) of the University of Papua New Guinea provided great assistance. Jerry Allen and Sue Morrison (Western Australian Museum) and Jeff Johnson (Queensland Museum) assisted with identifications. Jerry Allen and Jeff Johnson kindly commented on drafts of this paper.

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